Electronic Version
Stylesheet Version v1.1.1

Claims

[c1] What is claimed is:

1. A channel add/drop filter comprising:

a first 2D photonic crystal including a first waveguide made from a line defect and a first cavity made from a point defect, said first cavity acting to take in light of a specific wavelength from said first waveguide and radiate it outside said first photonic crystal and conversely acting to introduce light of a specific wavelength into said first waveguide from outside of said first photonic crystal;

a second 2D photonic crystal including a second waveguide having substantially the same characteristics as said first waveguide, and a second cavity having substantially the same characteristics as said first cavity; *and*

means for optically connecting said first and second waveguides in series so as to have light in common, and so that when the principal plane of said first 2D photonic crystal and the electric-field vector of the light within said first waveguide form an arbitrary angle □, the principal plane of said second 2D photonic crystal and the electric-field vector of the light within said second waveguide form an angle of □+ (π/2).

[c2] 2. A channel add/drop filter as set forth in claim 1, wherein:
said first and second 2D photonic crystals are disposed so that their principal planes are orthogonal to each other; and
said first and second waveguides connected to each other directly in series.

[c3] 3. A channel add/drop filter as set forth in claim 1, wherein:
said first and second 2D photonic crystals are disposed so that their principal planes are orthogonal to each other; and
said first and second waveguides connected to each other in series via a polarization-maintaining fiber.

[c4] 4. A channel add/drop filter as set forth in claim 1, wherein:
the first and second 2D photonic crystals are disposed so that their principal planes are parallel to each other; and
the first and second waveguides are connected to each other in series via a polarization-maintaining fiber, the polarization-maintaining fiber being twisted from the first-waveguide end to the second-waveguide end by $\pi/2$ about the fiber axis.

[c5] 5. A channel add/drop filter as set forth in claim 1, wherein:
the first and second 2D photonic crystals are disposed so that their principal planes are parallel to each other; and
the first and second waveguides are connected to each other in series via a Faraday rotator for rotating by π/2 the electric-field vector of the light.

[c6] 6. A channel add/drop filter as set forth in claim 1, wherein:
the first and second 2D photonic crystals are disposed so that their principal planes are parallel to each other; and
the first and second waveguides are connected to each other in series via a half-wave plate for rotating by π/2 the electric-field vector of the light.

[c7] 7. A channel add/drop filter comprising:
a first 2D photonic crystal including a first waveguide made from a line defect and a first cavity made from a point defect, said first cavity acting to take in light of a specific wavelength from said first waveguide and radiate it outside said first photonic crystal and conversely acting to introduce light of a specific wavelength into said first waveguide from outside of said first photonic crys-

tal;

a second 2D photonic crystal including a second waveguide having substantially the same characteristics as said first waveguide, and a second cavity having substantially the same characteristics as said first cavity; and

a 50/50 optical coupler optically parallel-connecting said first and second waveguides to a single optical fiber, said coupler connecting said first and second waveguides so that when the principal plane of said first 2D photonic crystal and the electric-field vector of the light within said first waveguide form an arbitrary angle □, the principal plane of said second 2D photonic crystal and the electric-field vector of the light within said second waveguide form an angle of □+ (π/2).

[c8] 8. A channel add/drop filter as set forth in claim 7, wherein:

said first and second 2D photonic crystals are disposed so that their principal planes are orthogonal to each other; and

said first and second waveguides are parallel-connected via respectively corresponding first and second polarization-maintaining fibers to the 50/50 optical coupler.

[c9] 9. A channel add/drop filter as set forth in claim 7, wherein:

said first and second 2D photonic crystals are disposed

so that their principal planes are orthogonal to each other; and

said first and second waveguides are parallel-connected directly to the 50/50 optical coupler.

[c10] 10. A channel add/drop filter as set forth in claim 7, wherein:

said first and second 2D photonic crystals are disposed so that their principal planes are parallel to each other;

said first waveguide is connected to said 50/50 optical coupler via a first polarization-maintaining fiber;

said second waveguide is connected to the 50/50 optical coupler via a second polarization-maintaining fiber; and

said second polarization-maintaining fiber is twisted from the optical-coupler end to the second-waveguide end by $\pi/2$ about the fiber axis.

[c11] 11. A channel add/drop filter as set forth in claim 7, wherein:

said first and second 2D photonic crystals are disposed so that their principal planes are parallel to each other;

said first waveguide is connected to said 50/50 optical coupler directly;

said second waveguide is connected to the 50/50 optical coupler via a polarization-maintaining fiber; and

said polarization-maintaining fiber is twisted from the optical-coupler end to the second-waveguide end by $\pi/$

2 about the fiber axis.

[c12] 12. A channel add/drop filter as set forth in claim 7, wherein:
said first and second 2D photonic crystals are disposed so that their principal planes are parallel to each other;
said first and second waveguides are parallel-connected via respectively corresponding first and second polarization-maintaining fibers to the 50/50 optical coupler; and
a Faraday rotator or a half-wave plate is inserted in the interval from the optical-coupler end to the second-waveguide end for rotating by $\pi/2$ the electric-field vector of the light.

[c13] 13. A channel add/drop filter as set forth in claim 7, wherein:
said first and second 2D photonic crystals are disposed so that their principal planes are parallel to each other;
said first and second waveguides are parallel-connected directly to the 50/50 optical coupler; and
a Faraday rotator or a half-wave plate is inserted in the interval from the optical-coupler end to the second-waveguide end for rotating by $\pi/2$ the electric-field vector of the light.

[c14] 14. A channel add/drop filter as set forth in claim 1, wherein:

said first 2D photonic crystal contains a plurality of cavities differing from one another in resonant frequency; and

said second 2D photonic crystal contains a plurality of cavities having substantially the same characteristics as those of the cavities in said first 2D photonic crystal.

[c15] 15. A channel add/drop filter as set forth in claim 7, wherein:

said first 2D photonic crystal contains a plurality of cavities differing from one another in resonant frequency; and

said second 2D photonic crystal contains a plurality of cavities having substantially the same characteristics as those of the cavities in said first 2D photonic crystal.

[c16] 16. A wavelength monitor comprising a channel add/drop filter as set forth in claim 1; and a photodetector for either directly or via optical fibers detecting light radiated from the cavities.

[c17] 17. A wavelength monitor comprising a channel add/drop filter as set forth in claim 7; and a photodetector for either directly or via optical fibers detecting light radiated from the cavities.